Research Journal of Pharmaceutical, Biological and Chemical Sciences

Real time Automobile Accident Exploration and Extrication System.

Suresh N*, Vinithraj R, and Shajithali S.

School of Electrical and Electronics, Sathyabama University, Chennai, India.

ABSTRACT

In developing as well as the developed countries, deaths due to vehicle accidents are on the rise. The prime reasons for this might be heavy traffic, unconditioned automobiles, improper roads, worst weather, poor driving skills etc. Once the accident happens the following three things has to be considered, first the victim need to be hospitalized immediately for treatment to recover from the fatal condition; secondly the accused from the other automobile responsible for the accident should be brought under the police custody for investigation and finally the causality vehicle has to be kept apart to avoid hindrance to the commuters. The paper reports the design of the real-time automobile accident exploration and extrication system. During accident, the proposed system automatically sends the location information to hospital, fire station and police station wirelessly. The system has to be integrated into the automobiles. Simplicity and cost effectiveness are the key features of the system .It can save the life of the person in danger with immediate medical assistance

Keywords: Accident Exploration system, Extrication system, Vehicle tracking system, Victim, Accused.

*Corresponding author

INTRODUCTION

In olden days, people used to travel by bullock carts, cycle and automobiles which ran at low speed. Now due to advancement in automobile technology, high speed cars are manufactured. Accidents due to these high speed automobiles are increasing day by day. In most cases, such accidents proved to be fatal for the humans. In spite of improvements in the safety features, vehicle collisions or other accidents still occurs. The steps which need to be taken after mishap are (1) the causality have to be hospitalized for medical assistance (2) the person responsible for the accident (accused) should be caught for investigation by the police (3) to avoid hindrance to the traffic, the victim vehicle has to be immediately sidelined. Once the vehicle collision happens the proposed system transmits the location information of the victim's vehicle to hospital, fire station and police station whereas accused vehicle information to police station alone wirelessly. The schematic diagram of the proposed automobile accident exploration and extrication system is shown in fig.1.
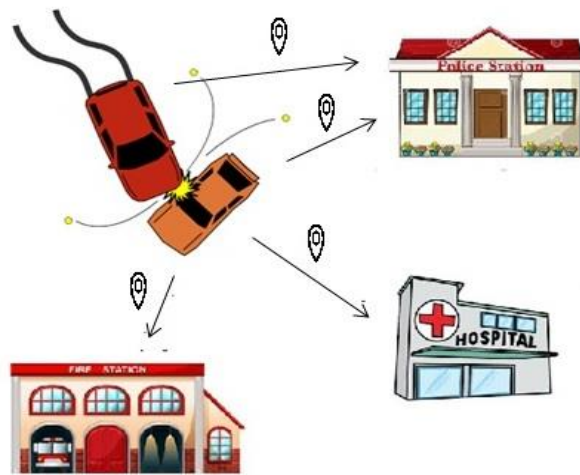

Fig.1: Accident Exploration and Extrication System-Schematic

MATERIALS AND METHODS

The proposed system for accident exploration and extrication basically consist of a microcontroller, Global Positioning system module, vibration sensor and wireless transceiver fitted to the automobile. When the vehicle meets an accident, the vibration sensor detects it and sends the signal to the microcontroller. The microcontroller in turn gets the location information of the vehicle through global positioning system module and initializes the transceiver to send the location information of the vehicle to hospital, police station and fire station wirelessly. The module which is fixed to the automobile is called the vehicle section. The module which is made available in hospital, police station and fire station is called host system. The host system receives the location details of the vehicle through transceiver and it is stored in the computer. Alarm has to be integrated into host system to alert the personnel. The block diagram of the vehicle section and the host system is shown in the fig.2.
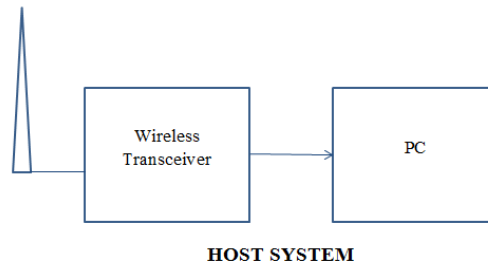

VEHICLE SECTION
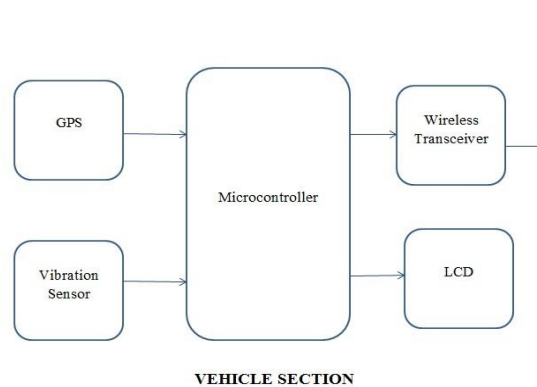
HOST SYSTEM

Fig.2: Vehicle section and Host System

Microcontroller

When the accident occurs microcontroller gets the location information through GPS and transmits the details via transceiver wirelessly. The microcontroller which is used for this purpose is the PIC16F877. The key features of this microcontroller are 8-bit 44 pin package, 256 bytes of EEPROM data memory; self-programming, Universal Asynchronous Receiver Transmitter (USART), the two wire Inter-Integrated Circuit, two PWM , eight channels of 10-bit analog to digital converter, parallel slave port etc .By means of PIC microcontroller peripheral components like vibration sensor, GPS and transceiver can be easily interfaced to it.

Vibration Sensor

In the proposed system vibration sensor is used to detect accident of the vehicle. When the accident occurs the vibration sensor sends the signal to the microcontroller. Operation of machines, vibration of rotating machines, optimum working condition of engines, etc can be checked by vibration sensor. The vibration sensor SW420 motion module is used for the prototype.

Global Positioning System

Global positioning system module in the proposed system checks the location of the vehicle under consideration. At all-weather conditions reliable information about the location with time information will be provided by a space based global navigation satellite system called Global Positioning System (GPS). Global navigation satellites send information about the present time, orbital details regarding GPS satellites. The GPS receiver computes the distance of the satellite from it and applying trilateration calculates the position.

Wireless Transceiver

The transceiver transmits the location information from the vehicle to the hospital, police station and fire station wirelessly. The transceiver on the host system receives the signal sent by the transceiver from the vehicle section. The received signal is stored in the computer. In our proposed system prototype, zigbee transceiver was used. Zigbee is the wireless technology in compliance with IEEE 802.15.4 standard. The frequency band used by the zigbee transceiver for wireless transmission is 2.4 GHz

RESULT AND DISCUSSION

The prototype of the proposed automobile accident exploration and extrication system is shown in fig 3.The Liquid crystal unit displays the present location of the vehicle. The power supply of the host system is provided by means of 12V battery. To the vehicle section components the power supply was provided from the main by rectifier and regulated power supply IC .The proposed system becomes simple and compact when it is manufactured on the large scale to be fitted into the vehicle
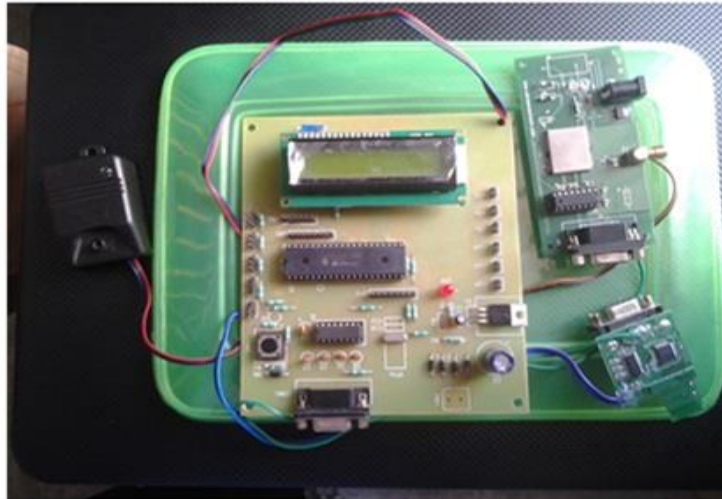
(a)
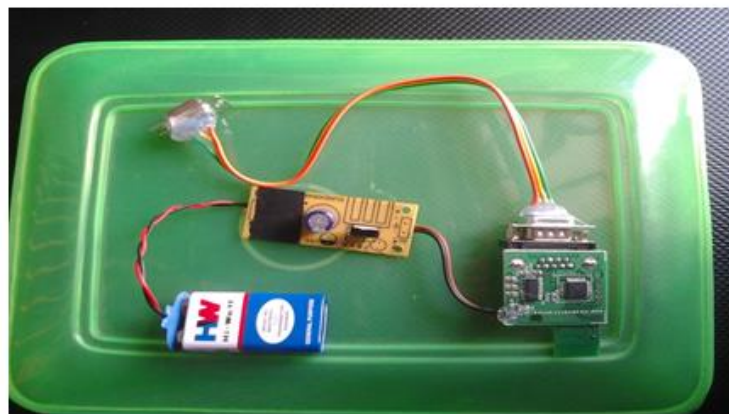
(b)

Fig.3: Prototype of automated accident exploration and extrication system (a) Vehicle section (b) Host System

CONCLUSION

The system helps in tracking the hit and run vehicles in an accident. It provides the latitude and longitude position of the accidental vehicles by using GPS. By the help of this system the death due to accidents can be reduced. Low cost and simplicity are the merits of the proposed system. In future, the system would have been made mandatory for all automobiles

REFERENCES

[1]   Chadil, N., A. Russameesawang, and P. Keeratiwintalcom, 2008."Real-time tracking management system using GPS, GPRS,Google Earth," ECTI-CON, 2008, pp 393-396..

[2]   Alkar, A.Z. and M.A. Karaca, . "An internet- based interactive embedded data-acquisition system for real-time applications," IEEE Transactions on Instrumentation and Measurement,2009, 58(3): pp 522-529

[3]   Chunyan Han, Dong Nie and Xinshusai Che, Xu Bai, "An Automobile Emergency Calling System", International Conference On Computer Design And Application,2010, Vol.4, pp.394-398.

[4]   P.R.Mukesh, and Muruganandham, "Real Time Web based Vehicle Tracking using GPS", World Academy of Science, Engineering and Technology,2010,pp.91-99,

[5]   Dr.Andre Pittet, Bharath Patil and Radhika Patil, "Energy Saving Techniques for GPS Based Tracking Applications", Integrated Communications, Navigation and Surveillance Conference,2011, pp.1-40.

[6]   Ericsson White Paper, "Communication and Information Services for National Security and Public Safety", International Journal of Electrical & Computer Sciences IJECS-IJENS, 2011, Vol.11, No.02,

[7]   Alumona T.L, Idigo V.E and Azubuike A.N, Technical Report on Data Acquisition of Patient's Health Status using GSM and WSN, SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE), 2014, Vol.1, issue 7.

[8]   Sawant Supriya C, Dr. Bombale U. L. and Patil T.B,‖ An Intelligent Vehicle Control and Monitoring Using Arm‖, International Journal of Engineering and Innovative Technology (IJEIT), 2012, Vol 2,pp.56-59.

[9]   J. M. Hu, J. Li, and G. H. Li, "Automobile anti-theft system based on GSM and GPS module," presented at the Fifth International Conference on Intelligent Networks and Intelligent Systems, Tianjin, China, 2012,pp 1-4.

[10]   Ms. Sarika B. Kale, Gajanan P. Dhok "Embedded system for intelligent ambulance and traffic control management International Journal of Computer and Electronics research" ,2013, Vol 2, Issue 2.

[11]   V.Ramya, B. Palaniappan, K. Karthick, "Embedded Controller for Vehicle In-Front Obstacle Detection and Cabin Safety Alert System", International Journal of Computer Science & Information Technology (IJCSIT), 2012,Vol 4, No 2,

[12]   Asaad M. J. Al-Hindawi, Ibraheem Talib, "Experimentally Evaluation of GPS/GSM Based System Design", Journal of Electronic Systems ,2012, Vol 2 No. 2.